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# **AN APPRAISAL OF THE BOMBING OF NORTH VIETNAM**



**(THROUGH 14 NOVEMBER 1966)**

**NOVEMBER 1966**

**S-0020/AP-4**

Prepared Jointly by  
The Central Intelligence Agency  
and  
The Defense Intelligence Agency



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## **AN APPRAISAL OF THE BOMBING OF NORTH VIETNAM THROUGH 14 NOVEMBER 1966**

### **FOREWORD**

This report is prepared on a monthly basis at the request of the Secretary of Defense for an evaluation of certain effects of the ROLLING THUNDER program. The report covers three general areas of concern: Effects on Military Targets; Leadership and Public Reactions; and Effects on the NVN Economy. The discussion of political effects is limited to those developments within North Vietnam which relate to Hanoi's attitude toward continuing the war and the effects of the ROLLING THUNDER attack has on civilian morale in North Vietnam.

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AN APPRAISAL OF THE BOMBING OF NORTH VIETNAM  
THROUGH 14 NOVEMBER 1966

SUMMARY

1. (S/NFD) Interdiction of the lines of communication (LOCs) continued during the current reporting period as did strikes against POL facilities and other military targets, although at a lesser rate than in the last three reporting periods due to adverse flying weather. Weather conditions improved in early November with a resultant improvement in the rate of damage caused by increased strike sorties.

2. (S/NFD) The North Vietnamese took advantage of the adverse weather to strengthen their defenses and shore up the vital interdicted transportation routes, particularly in the northern part of the country. As a result, the railroad system is probably in a better position to carry freight in mid-November than at any time since the resumption of bombing at the end of January 1966. Three of the five major rail lines -- from Hanoi to Dong Dang, Haiphong and Thai Nguyen -- have remained open for through service almost continually during the current reporting period. There were significant decreases in the rate of damage to both LOCs and transport equipment during the period. Construction units repairing or working on new roads in the southern part of North

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Vietnam have continued to improve the road network, but are probably now experiencing additional difficulties because of the rains in that region. There is some evidence of fuel shortages in MR IV. This condition has probably resulted primarily from distribution problems caused by inadequate planning and allocation rather than a general shortage of POL.

3. (S/NFD) Expansion of the North Vietnamese armed forces and infiltration of men and supplies into SVN and Laos continues. However, pursuit of the war effort is becoming progressively more costly and difficult for Hanoi. While it is estimated that NVN's capability for sustained overt aggression has been limited by the US air efforts, the North Vietnamese retain the capability to continue to support their present level of activities in South Vietnam and Laos.

4. (S/NFD) North Vietnam's harshly worded propaganda response to last month's Manila Conference once again emphasized the Hanoi leadership's determination to press on with the war despite continuing US bombings. Despite press and diplomatic reports that there will be some move toward negotiations if the US stops bombing NVN, there has been no specific guarantee from Hanoi on this nor is there any indication that Soviet or Eastern European sources are speaking with the authorization of the NVN regime. There has

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been some decline in popular morale throughout the country due to the bombing. However, there continues to be no indication that the regime's resolve has been weakened to any appreciable extent.

5. (S/NFD) The major measurable effects of air strikes on the North Vietnamese economy are the diversion of substantial amounts of material and of some 300,000 civilians -- 200,000 on a full-time basis -- to repair, reconstruction, dispersal programs, and the extensive physical damage inflicted on selected military and economic targets. Agricultural production and industrial growth have also been disrupted. However, the reallocation of labor and the greater employment of women in the labor force have prevented the manpower problem from reaching critical proportions. Transportation and other basic services apparently continue to perform at a level adequate for military and essential civilian needs. Large scale deliveries of economic aid from the communist countries continue to be instrumental in maintaining North Vietnam's economic viability in the face of the bombing. Measurable damage to the military establishment and to the economy caused by the air strikes now stands at more than \$152 million.

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~~SECRET-NO FOREIGN DISSEM~~Effects on Military Targets

1. (S/NFD) Interdiction of the lines of communication (LOCs) continued during the current reporting period as did strikes against POL facilities and other military targets, although at a lesser rate than in the last three reporting periods. Weather conditions which had been bad for most of October improved in early November with a resultant improvement in the rate of damage caused by increased strike sorties. The North Vietnamese took advantage of the adverse weather to strengthen their defenses and shore up the vital interdicted transportation routes, particularly in the northern part of the country. As a result, the railroad system is probably in a better position to carry freight in mid-November than at any time since the resumption of bombing at the end of January 1966. Construction units repairing or working on new roads in the southern part of North Vietnam have continued to improve the road network there, but are probably now experiencing additional difficulties because of the rains in that region. There is some evidence of fuel shortages in MR IV. This condition has probably resulted primarily from distribution problems caused by inadequate planning and allocation rather than from a general shortage of POL. The pattern of petroleum distribution has been distorted by the air strikes and periodic local shortages of POL will probably continue to appear in the future.

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2. (S/NFD) In spite of an overall increase in air strikes against the rail lines during 1966, there has been no significant increase in the total length of time the rail lines have been interdicted for through rail service. The Hanoi-Dong Dang and Hanoi-Haiphong lines, the two most important lines for the movement of both imports and domestic goods, have been interdicted for a total of only about two months and one month, respectively, during the year. The volume of traffic moved on these two lines could easily have been equal to that moved in a comparable period in 1965. The average monthly volume of rail traffic in North Vietnam, however, is estimated to have decreased in 1966, primarily because of the loss of through service on the Hanoi-Lao Cai line for a proportionately longer time than in 1965. In addition, the Hanoi-Vinh line has been disrupted for through rail service almost continually since the resumption of bombing late in January 1966. It is estimated that the decrease in traffic carried on the Lao Cai and Vinh rail lines probably has been compensated by an increase in freight carried by trucks and watercraft.

3. (S/NFD) The railroad system probably is in a better position to carry freight in mid-November than at any time since the resumption of bombing in January. Three of the five major rail lines -- from Hanoi to Dong Dang, Haiphong, and Thai Nguyen -- have remained open for through service almost continually in the current reporting period. The Hanoi-Lao Cai line is open for a limited

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amount of through rail traffic, with a rail ferry at Viet Tri circumventing the only unrepaired bridge on the line. Shuttle service also appears to be continuing at this point. Through rail service on the Hanoi-Vinh line has again been interrupted further to the north by the destruction of the two bridges at Cao Duong, with shuttle service continuing on open segments of the line. The Duc Tho to Thuong Phong Trang line is so heavily interdicted as to be of no practical use for any traffic north of Phuong Dien.

4. (S/NFD) Steadily deteriorating weather conditions over North Vietnam during the month of October generally resulted in significant decreases in the rate of damage to both fixed and moving highway targets. Only minor damage to highway LOCs was recorded north of the 20th parallel as a result of the limited air strikes. The bulk of the reported road cuts or cratered segments were located along the highways south of Thanh Hoa. In this region, Route 1A was heavily cratered from the DMZ to Ha Tinh and between Dien Chau and Long Yen. Route 15, the inland north-south artery, was also heavily cratered from Xom Ve to Linh Cam in Route Packages 1 and 2 and between Phu Qui and Lam Song in Route Packages 3 and 4. The chart at Tab A contains the results of strikes on North Vietnamese targets through 14 November 1966.

5. (S/NFD) During October there was a decrease in the number of watercraft destroyed or damaged by air strikes. Activity continued to increase on the Song Con and the Song Ca - waterway

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routes offering potential for southward movement - in probable response to the attacks on craft on the more direct north-south intra-coastal routes. The usually heavy activity concentrated on the intra-coastal route between Thanh Hoa and Vinh dropped off considerably toward the end of the month. The heavy traffic reported in the Thanh Hoa area reflects utilization of a recently improved north-south connecting waterway route crossing the Song Ma Delta waterways. Coastal activity in the vicinity of Dong Hoi remained high and approximately half of all coastal strikes were in this area. In addition, two US destroyers reportedly damaged or destroyed about 300 watercraft between the DMZ and 17°30'N. Increased sightings of traffic were made periodically in the coastal approaches to Haiphong. These sightings suggest continued utilization of coastal routes in that area.

6. (S) There was no significant change in the rate and pattern of NVN AAA deployment. The gun counts continue to increase mainly around Hanoi, Haiphong, and along the major LOCs in the northern part of the country. Virtually all newly identified equipment has been used to expand previous defenses.

7. (S) Air strikes against EW and GCI type radars have resulted in the destruction of valuable equipment. However, an estimated 5 per cent increase in available equipment, during the last 30 days, has left the North Vietnam airwarning and ground-controlled intercept

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system virtually intact. The effect of strikes against radars supporting AAA and SAM sites is still difficult to evaluate although it has been disruptive. The inventory of SAM associated radars (FAN SONG) is estimated to have increased eight per cent; there has been a 22 per cent increase in fire control radars.

8. (S) NVN jet fighter activity during the month of October was well below that of recent months. A total of only five air engagements were reported, all in the first nine days of the month. North Vietnam losses were one MIG-21 and one unidentified MIG, with an additional unidentified MIG damaged. Reacting MIGs originated from either Phuc Yen or Hanoi/Gia Lam. NVN fighters on three occasions in early November attempted to shoot down a US electronic countermeasure aircraft in the vicinity of Yen Bai. Covering US fighters shot down two MIG-21s during one of these attempts on 5 November.

9. (S) SA-2 activity during the first part of the reporting period was extremely low, with only 25 missile firings having been reported. This can be attributed in part to the fact that most US air activity took place in areas not heavily protected by SA-2s. However, activity returned to a more normal level in early November with 66 missiles being fired. There is evidence that NVN may be encountering some shortages in replacement missiles, forcing the adoption of an austerity program. The

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southernmost SAM site discovered to date was detected on 12 October approximately 13 nautical miles northwest of Dong Hoi. This site was attacked on 12 and 13 October, and completely destroyed. Additional new sites were discovered in October and November, raising the current number of sites capable of accepting missiles to 138.

10. (S/NFD) Expansion of the North Vietnamese armed forces and infiltration of men and supplies into SVN and Laos continues. However, pursuit of the war effort is becoming progressively more costly and difficult for Hanoi. While it is estimated that NVN's capability for sustained overt aggression has been limited by the US air efforts, the North Vietnamese retain the capability to continue to support their present level of activities in SVN and Laos. It is interesting to note, however, that VC/NVA initiated large-scale military actions in SVN have remained at a low-level for sometime. In addition, there are some indications that shortages of supplies and morale problems are becoming more prevalent in VC/NVA units. It appears that the continued destruction and damage to North Vietnam coupled with US operations in SVN are now beginning to have an effect on the enemy capability to continue the war successfully on the scale his present organization in SVN would indicate.

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**SECRET—NO FOREIGN DISSEM**Leadership and Public Reactions

11. (S/NFD) North Vietnam's harshly worded propaganda response to last month's Manila Conference once again emphasized the Hanoi leadership's determination to press on with the war despite the continuing US bombings. This determination was further underscored in NVN statements regarding the "valuable assistance" recently offered by bloc countries which will enable the "Vietnamese people" to achieve "complete victory" in the war against the Americans. There have been reports from press and diplomatic sources that Hanoi will make some move toward negotiations if the US stops bombing North Vietnam. There has been, however, no specific guarantee from Hanoi on this nor is there any indication that Soviet or Eastern European sources are speaking with the authorization of the NVN regime.

12. (S/NFD) There has been some decline in popular morale throughout the country due to the bombing. However, there continues to be no indication that the regime's resolve has been weakened to any appreciable extent. The dislocations resulting from the evacuations taken together with difficulties in distribution and food shortages have caused hardships but the best available evidence continues to suggest that popular resentment is directed more at the US than at the Government. To enhance this popular anger, the regime has in the past two weeks published a long list of "war crimes" allegedly committed by the Americans.

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~~SECRET-NO FOREIGN DISSEM~~Effects on the Economy

13. (S/NFD) The major measurable effects of air strikes on the North Vietnamese economy are the diversion of substantial amounts of material and of some 300,000 civilians -- 200,000 on a full-time basis -- to repair, reconstruction, and dispersal programs, and the extensive physical damage inflicted on selected military and economic targets, principally those associated with transportation and petroleum storage and distribution. Agricultural production and industrial growth have also been disrupted. However, the reallocation of labor and the greater employment of women in the labor force have prevented the manpower problem from reaching critical proportions. This is further supported by a report attributed to Ho Chi Minh, that university and professional school enrollment in 1966 is at roughly the same level as in 1965. Moreover, the reallocation of labor has apparently enabled transportation and other functions to perform at a level adequate for military and essential civilian needs.

14. (S/NFD) Large scale deliveries of economic aid from the communist countries continue to be instrumental in maintaining North Vietnam's economic viability in the face of the bombing. In the first nine months of 1966 deliveries of economic aid from the USSR alone probably totaled about \$200 million, compared with total economic deliveries of \$150 million in 1965 and an annual average

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of \$50-\$75 million in 1955-64. An unconfirmed report from Poland on the recent Warsaw Pact meeting states that the Pact countries had signed pledges of \$1 billion in goods and cash, 80 per cent of which would be from the USSR, to support the North Vietnamese war effort. If this report is true, it almost certainly includes long-term aid to North Vietnam.

15. (S/NFD) There are indications that Hanoi is seeking a general speed-up of deliveries of machinery and equipment from the Communist countries in late 1966. The requests are not only limited to goods that may be related to the military effort -- vehicle spare parts and railway equipment -- but include a wide variety of durable goods. The equipment is needed to replace bomb-damaged equipment -- principally transportation equipment -- to supply dispersed industrial sites, and/or to provide for additional industrial facilities.

16. (S) Dispersal of industry and evacuation of the urban population continue to be stressed by the Hanoi regime. Most collateral reporting, on the other hand, shows little evidence of either extensive dispersal or permanent evacuation. Recent government attention to the development of regional markets may be intended to make movement of industry and personnel more palatable as well as to facilitate distribution.

17. (S/NFD) The North Vietnamese have attempted to lessen the disruptive effects of the bombing attacks on agriculture by importing

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increased amounts of chemical fertilizers and substantial numbers of diesel generators to power the irrigation systems. The air strikes, nevertheless, continue to have a disruptive effect on production, although it is too early to evaluate their effect on the fall rice crop. Recent information indicates that the air strikes have seriously interfered with fishing activities in North Vietnam. Fishing schedules have been interrupted and the fish catch has been reduced. In addition, at least six facilities responsible for processing sea products have been damaged and their activity reduced or in some cases eliminated.

18. (S/NFD) The neutralization of most of the major petroleum storage facilities has resulted in an expensive dispersal program and created difficulties in distributing petroleum internally. The problems appear to be essentially those caused by management and transportation rather than an overall shortage of petroleum products.

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Strikes against POL installations were at a lower rate in October than in September. Five JCS targeted facilities were struck, but less than 75 dispersed sites were hit. The POL facility at Haiphong was not struck during this period.

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19. (S) In the period July thru mid-November 1966, only two large tanker shipments from the Black Sea arrived in North Vietnam. In addition to the two large tanker movements, three shipments in small tankers from Vladivostok, increased rail movements, and dry cargo ships were also used during this period for delivery. The

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Unless new equipment has been delivered to NVN, the Haiphong POL facility will probably not be usable for offloading, and the tanker will have to be discharged into barges.

20. (S) North Vietnam's seaborne exports remain far below pre-bombing averages, with no apatite shipped by sea in October and shipments of coal and cement down 27 per cent and 55 per cent, respectively, from base period norms. Coal shipments from Cam Pha in October, however, were the highest since April indicating that some of the bomb damage incurred in that month has been repaired.

21. (S/NFD) Restoration of the small Ben Thuy powerplant was set back by three air strikes in October. The total generating capacity in North Vietnam put out of service by the strikes remains at an estimated 59,000 kilowatts, or 32 per cent of total installed generating capacity. Despite this destruction, however, there has been only a minor effect on the economy. Three powerplants which have not been struck continue to supply the needs of the population and industry in the Hanoi-Haiphong area.

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22. (S/NFD) Direct losses caused by air strikes against economic facilities and equipment measured in terms of estimated reconstruction or replacement cost are now estimated at some \$132 as shown in Table A. Damage to transport equipment in October was at the lowest level since June reflecting the poor flying weather and the reduced number of air strikes. Measurable indirect losses -- principally reduced foreign exchange earnings and losses in agricultural crops -- total at least 20 million dollars. In addition, there are many other losses and costs to the economy and the military establishment which cannot be assigned values. These include the costs of current operations, increased defense costs, the loss of production and lower productivity of labor, time lost from work as a consequence of civil defense measures, and loss of production caused by shortages of electric power.

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<u>Economic Facilities and Equipment</u>		<u>Military Facilities and Equipment</u>	
<u>Targets</u>	<u>Million Dollars</u>	<u>Targets</u>	<u>Million Dollars</u>
Railroad/Highway Bridges*		Barracks	16.5
Reconstruction	17.3	Ammunition Storage	4.5
Temporary Repairs	3.6**	Supply Depots	3.2
Transportation Equipment	33.1***	Radar and Communications	1.2
Railroad Yards and Ports	1.0	Naval Bases	0.8
Electric Power Plants	11.5	SAM Sites	2.0
Petroleum Storage Facilities	2.3****	Aircraft	20.0
Manufacturing Facilities	2.1	Airfields	0.4
Telecommunications Facilities	0.2	Naval Craft	10.8
		Miscellaneous Targets of Armed Reconnaissance	1.3
Total	<u>71.1</u>	Total	<u>60.7</u>

\* The estimate in this category is incomplete because of inadequate post-strike photography.

\*\* Includes 2.5 million dollars expended to date on temporary repairs and 1.1 million dollars required to provide temporary repairs for structures damaged but not yet restored to operable condition.

\*\*\* Excludes destruction and damage to trucks in Laos. The estimated value of damage and destruction to transportation equipment in North Vietnam is based on pilot reports and may be somewhat overstated.

\*\*\*\* Excludes destruction and damage to support facilities and contents of petroleum tanks.

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RESULTS OF STRIKES ON NVN TARGETS a/ THRU 14 Nov 1966 TABLE 350

Fixed Targets	Total Targets		Targets Struck		No. Atks	b/ Strike Sorties	% National Capacity	
	No. c/	Targeted d/ No(*) %	No(*) %	d/			Destroyed	Inactive g/
Barracks	443 man	62 40.72	45 33.0	223	2364	22.68		
Ammo Depots	112.6 MT	18 96.7	13 75.7	52	1155	73.4	37.61	
POL Storage*	131.9 MT	13 100.0	11 84.6	67	524	85.1		
Supply Depots	10550 SqFt	26 40.77	17 19.0	51	601	13.48		
Power Plants	187 KW	20 94.5	7 46.6	34	283	31.6		
Maritime Ports	7.8 ST/DY	6 95	6 28	23	229	13.0	2.63	
Railroad Yards	33.7 ST/DY	4 78	2 19	18	139	9.3		
Explosive Plant	1 MT	1 100	1 100	3	28	71		
Airfields	23		4	12	359			
Naval Bases	15		3	19	217			
Bridges	61		48	248	2599			
Commo Install	45		2	2	15			
Radar Sites	50		5	73	430			
SAM Sites	130		47	62	338			
Locks & Dams	8		2	2	10			
Ferries	34		11	7	44			

\* JCS targets only; does not include dispersed storage.

Total Sorties: 9538	Results f/
Armed Recce Sorties	Destroyed Damaged
83,604	Vessels 3782 6336
	Vehicles 2438 2319
	RR Stock 1484 1782

a/ Assessments are based on best information received, will be refined as more accurate information becomes available.

b/ Strike plus flak suppression sorties. Some applied to multiple targets; in this summary assigned to principal target.

c/ National capacity in 1,000's where measurement shown.

d/ Percentages of national capacity where appropriate.

e/ Also numerous attacks during armed recce and other missions.

f/ Also numerous installations, AA sites, bridges, etc, attacked and road and rail cuts made.

g/ Per cent inactive due to dismantling or abandonment of facilities as a result of air strikes.

(\*) These columns are not additive, since the number of installations, both targeted and struck in some cases, apply to more than one category of targets. (i.e., barracks, supply and ammo depots).

NOTE: For comparative purposes.

US worldwide ammo storage capacity is 6,936,000 metric tons (CONUS 5,719,000 MT).

US worldwide military POL storage capacity is 15,452,000 MT; national US Commercial capacity is 151,325,000 MT; approximate average \$ value of 1 MT of POL products is \$28.

US worldwide military supply depot covered storage space is 137,100,000 sq. ft., (CONUS 121,300,000 sq. ft.).

Total kilowatt capacity of power plants serving metropolitan areas: New York - 7.6 million; Chicago 6 million; Washington (DC and Md/suburbs only) - 2.4 million.

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TAB A

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